LISTING OF CLAIMS:

Claim 1 (Currently Amended): A method for visualizing internal functioning of operation of an integrated circuit, comprising:

a. the step of obtaining device activity based on one or more of measured or simulated activity of the device;

b. the step of expressing the obtained device activity in a defined representation form; and

c. the step of representing the expressed activity, by using said defined representation form, in a visual form that illustrates causal relationship that one or more device activities has on one or more other device activities;

wherein said representing step includes the step of visualizing the device activity representation as a simulation of optical emissions that occur as a result of the device activity.

Claim 2 (Original): A method according to claim 1, wherein said representation includes sequence, connectivity and causal relationship information.

Claim 3 (Original): A method according to claim 1, wherein said representing step includes the step of visualizing the expressed activity in an IC CAD viewer.

Claim 4 (Cancel).

Claim 5 (Original): A method according to claim 1, wherein the obtaining step includes the steps of:

applying device activity traces as inputs to the circuit; and

measuring sequences of logical states at designated elements.

Claim 6 (Original): A method according to claim 5, wherein the expressing step includes the step of expressing the measured sequences in a sequence graph format.

Claim 7 (Original): A method according to claim 1, wherein said obtaining step includes the step of obtaining an activity trace based on one or more of measured or simulated activity.

Claim 8 (Original): A method according to claim 1, wherein the visual form is a slow motion animation.

Claim 9 (Original): A method according to claim 8, wherein the slow motion animation is a video visualization.

Claim 10 (Original): A method according to claim 1, wherein the visual form is an animated schematic.

Claim 11 (Original): A method according to claim 10, wherein in the animated schematic, the devices or collection of devices appear highlighted, or change color, shape or otherwise visualize the occurrence of switching.

Claim 12 (Original): A method according to claim 1, wherein audio representation of circuit activity augments the visualization by the occurrence of sound in conjunction with the visual indication of circuit activity.

Claim 13 (Original): A method according to claim 12, wherein the audio frequency or other audio character is related to the timing relationships of the switching events.

Claim 14 (Original): A method according to claim 13, wherein the timing relationships of the switching events include delay from prior switching event, or device transition speed, or input to output delay.

Claim 15 (Original): A method according to claim 1, wherein switching behavior is mapped to a mathematical graphical representation which is related to a netlist.

Claim 16 (Previously Presented): A method according to claim 1, further comprising the step of modeling the emissions as a hot electron photoluminescence model.

Claim 17 (Previously Presented): A method according to claim 1, further comprising the step of assigning the emission based on a two-state model according to whether the device is switching or not.

Claim 18 (Original): A method according to claim 17, wherein the method of determining the switching state of a device is by thresholding the current.

Claim 19 (Previously Presented): A method according to claim 17, further comprising the step of assigning the switching state by checking for logical state transitions at nets corresponding to the terminals of a device to detect if the device switches in response to the input level(s) to the device.

Claim 20 (Previously Presented): A method according to claim 1, wherein an areal view of the simulation is produced from the simulation emission.

Claim 21 (Previously Presented): A method according to claim 1, further comprising the step of designating regions of a device as an array of pixels overlaid to the device.

Claim 22 (Original): A method according to claim 20, wherein the areal distribution model is a Gaussion distribution from point sources from designated areas of the device.

Claim 23 (Previously Presented): A method according to claim 20, wherein the illumination intensity at each pixel results from a Monte Carlo simulation of events.

Claim 24 (Original): A method according to claim 1, wherein the visual form is a current flow animation.

Claim 25 (Original): A method according to claim 1, wherein the visual form is a local power dissipation animation.

Claim 26 (Original): A method according to claim 1, wherein the visual form is a verification trace animation.

Claim 27 (Original): A method according to claim 1, wherein the simulated activity is a circuit electrical simulation and is conducted for manufacturing test and subsequently animated.

Claim 28 (Original): A method according to claim 1, wherein the visual form is a sequence graph depicting the causal order of waveform transition events.

Claim 29 (Original): A method according to claim 27, wherein the electrical simulation is conducted for manufacturing test and subsequently animated for optical emission.

Claim 30 (Previously Presented): A method according to claim 1, wherein optical emission measurement data is compared to optical emission simulation data and the regions of agreement or disagreement between the two are identified.

Claim 31 (Previously Presented): A method according to claim 1, wherein logical state data gathered from optical emission measurement is compared to logical state data from simulation and the areas of agreement or disagreement between the two are identified.

Claim 32 (Original): A method according to claim 1, wherein the expressing step includes the step of expressing the device activity in a sequence graph format.

Claim 33 (Original): A method according to claim 32, wherein the sequence graph is derived from a netlist or schematic, and comprises a record of the events that occurred within the network as a result of the system input.

Claim 34 (Original): A method according to claim 1, wherein the obtaining step includes the step of obtaining optical emissions from the circuit as a result of stimuli input to the circuit.

Claim 35 (Original): A method according to claim 34, wherein the optical emissions are generated by switching activity caused by the input stimuli.

Claim 36 (Currently Amended): A method for visualizing internal functioning of operation of an integrated circuit, comprising:

a. the step of obtaining device activity based on one or more of measured or simulated activity of the device;

b. the step of expressing the obtained device activity in a defined representation form; and

c. the step of representing the expressed activity, by using said defined representation form, in a visual form that illustrates causal relationship that one or more device activities has on one or more other device activities, wherein:

the obtaining step includes ~~the steps of~~

i) the step of using an instruction trace to obtain a first representation of device activity, and

ii) the step of using a testvector sequence to obtain a second representation of device activity; and

further including the step of comparing the first and second representations to determine how well the testvector recreates the activity generated by the instruction trace.

Claim 37 (Currently Amended): A method for visualizing internal functioning of operation of an integrated circuit, comprising:

a. the step of obtaining device activity based on one or more of measured or simulated activity of the device;

b. the step of expressing the obtained device activity in a defined representation form; and

c. the step of representing the expressed activity, by using said defined representation form, in a visual form that illustrates causal relationship that one or more device activities has on one or more other device activities, wherein:

the obtaining step includes the step of using a testvector sequence to cause device activity; and

further including the step of analyzing said device activity to verify or debug the testvector sequence.

Claim 38 (Original): A method according to claim 1, wherein the circuit is an asynchronous circuit.

Claim 39 (Previously Presented): A system for visualizing behavior of an integrated circuit, comprising:

a. means for simulating activity of the circuit, wherein said simulator activity causes optical emissions from the circuit;

b. means for expressing the circuit activity as a defined device activity representation; and

c. means for visualizing the device activity representation as a simulation of optical emissions that are caused by the activity that is being simulated.

Claim 40 (Previously Presented): A system according to claim 39, wherein said device activity representation includes sequence, connectivity and causal relationship information.

Claim 41 (Previously Presented): A system according to claim 39, wherein said means for visualizing includes an IC CAD viewer for visualizing the expressed activity.

Claim 42 (Cancel).

Claim 43 (Previously Presented): A system according to claim 39, wherein the means for simulating circuit activity includes:

means for applying device activity traces as inputs to the circuit; and

means for measuring sequences of logical states at designated elements.